Material parameters:/
Korrels:
$$n = \frac{V_v}{V}\ ; \qquad e = \frac{V_v}{V_s}\ ; \qquad S = \frac{V_w}{V_v}\ ; \qquad w = \frac{W_w}{W_s}\ ; \qquad w = Se\frac{\rho_w}{\rho_s}\ ; \qquad RD = \frac{e_{\max} - e}{e_{\max} - e_{\min}}\ ;$$

Stress:/Spanning:
$$\sigma'_{ij} = \sigma_{ij} - p\delta_{ij}\ ; \qquad \sigma_0 = \frac{1}{3}\left(\sigma_1 + \sigma_2 + \sigma_3\right) = \frac{1}{3}\left(\sigma_{xx} + \sigma_{yy} + \sigma_{zz}\right)\ ;$$

Flow:/Stroming:
$$q = -ki\ ; \qquad q = \frac{Q}{A}\ ; \qquad i = \frac{\partial h}{\partial s}\ ; \qquad h = z + \frac{p}{\gamma_w}\ ; \qquad k = \frac{\kappa\gamma_w}{\mu}\ ; \qquad \kappa = cd^2\frac{n^3}{(1-n)^2}\ ;$$
$$i_{\text{crit}} = -\frac{\gamma_s - \gamma_w}{\gamma_w}\ ; \qquad \frac{\Delta\Phi}{\Delta s} = \frac{\Delta\Psi}{\Delta n} \qquad (\Phi = kh)\ ; \qquad Q = \frac{n_s}{n_p}k\Delta hB\ ;$$

Falling head test:
$$h = h_0\exp(-k\frac{A}{aL}t)\ ;$$

Confined aquifer:
$$h_0 - h = -\frac{Q_0}{2\pi kH}\ln\frac{r}{R}\ ; \qquad \text{Unconfined aquifer:} \qquad h_0^2 - h^2 = -\frac{Q_0}{\pi k}\ln\frac{r}{R}\ ;$$

Continuum:/
Continuüm:
$$\varepsilon_{xx} = \frac{1}{E}\left[\sigma'_{xx} - \nu(\sigma'_{yy} + \sigma'_{zz})\right]\ ; \qquad \tau_{xy} = 2G\varepsilon_{xy}\ ; \qquad \sigma_0 = K\varepsilon_{\text{vol}}\ ; \qquad \varepsilon_{zz} = m_v\sigma'_{zz}\ ;$$
$$\frac{1}{m_v} = E_{\text{oed}} = K + \frac{4}{3}G = \frac{E(1-\nu)}{(1+\nu)(1-2\nu)}\ ; \qquad K = \frac{E}{3(1-2\nu)}\ ; \qquad G = \frac{E}{2(1+\nu)}\ ;$$

Compression:/
Samendrukking:
$$\varepsilon = \frac{1}{C_{10}}\log\frac{\sigma'}{\sigma'_1}\ ; \qquad \varepsilon = \frac{1}{C_p}\ln\frac{\sigma'}{\sigma'_1}\ ; \qquad e_1 - e = C_c\log\frac{\sigma'}{\sigma'_1}\ ; \qquad \text{Koppejan:} \quad \varepsilon = \left[U\frac{1}{C_p} + \frac{1}{C_s}\log\frac{t}{t_0}\right]\ln\frac{\sigma'}{\sigma'_1}\ ;$$
$$\text{Bjerrum:} \quad e_0 - e = C_r\log\frac{\sigma'_p}{\sigma'_0} + C_c\log\frac{\sigma'}{\sigma'_p} + C_\alpha\log\frac{t}{t_0}\ ; \qquad \varepsilon = \frac{\Delta e}{1+e}\ ;$$

Consolidation:/
Consolidatie:
$$\frac{\partial p}{\partial t} = c_v\frac{\partial^2 p}{\partial^2 z}\ ; \qquad \frac{p}{p_0} = \frac{4}{\pi}\sum_{j=1}^{\infty}\frac{(-1)^{j-1}}{2j-1}\cos\left[(2j-1)\frac{\pi}{2}\frac{z}{h}\right]\exp\left[-(2j-1)^2\frac{\pi^2}{4}\frac{c_v t}{h^2}\right]\ ;$$
$$c_v = \frac{k}{\gamma_w m_v}\ ; \qquad \frac{c_v t}{h^2} \gg 0.1: \quad \frac{p}{p_0} = \frac{4}{\pi}\cos\left[\frac{\pi}{2}(\frac{h-z}{h})\right]\exp(-\frac{\pi^2}{4}\frac{c_v t}{h^2})\ ;$$
$$\frac{c_v t_{99\%}}{h^2} = 1.784\ ; \qquad \frac{c_v t_{90\%}}{h^2} = 0.848\ ; \qquad \frac{c_v t_{50\%}}{h^2} = 0.197\ ; \qquad \frac{c_v t_{1\%}}{h^2} = 10^{-4}\ ;$$
$$U = \frac{\Delta h - \Delta h_0}{\Delta h_\infty - \Delta h_0} = 1 - \frac{8}{\pi^2}\sum_{j=1}^{\infty}\frac{1}{(2j-1)^2}\exp[-(2j-1)^2\frac{\pi^2}{4}\frac{c_v t}{h^2}]\ ; \qquad U < 0.7: \quad U = \frac{2}{\sqrt{\pi}}\sqrt{\frac{c_v t}{h^2}}\ ;$$
$$p_i(t+\Delta t) = p_i(t) + \alpha\left\{p_{i+1}(t) - 2p_i(t) + p_{i-1}(t)\right\}\ ; \qquad \alpha = c_v\frac{\Delta t}{(\Delta z)^2}\ ;$$

Mohr-Coulomb:
$$(\frac{\sigma'_1 - \sigma'_3}{2}) - (\frac{\sigma'_1 + \sigma'_3}{2})\sin\phi' - c'\cos\phi' = 0\ ; \qquad \sin\phi' = \frac{\frac{1}{2}(\sigma'_1 - \sigma'_3)}{c'\cot\phi' + \frac{1}{2}(\sigma'_1 + \sigma'_3)}\ ;$$
$$\sigma'_1 = \sigma'_3\frac{1+\sin\phi'}{1-\sin\phi'} + 2c'\frac{\cos\phi'}{1-\sin\phi'} = \sigma'_3\tan^2(45^\circ + \phi'/2) + 2c'\tan(45^\circ + \phi'/2)\ ; \qquad \tau_f = c' + \sigma'_n\tan\phi'\ ;$$

Undrained:/
Ongedraineerd:
$$c_u = s_u \approx \frac{\sigma'_1 - \sigma'_3}{2} = \frac{c'\cos\phi' + \bar{p}'\sin\phi'}{1 - \frac{1}{3}\sin\phi'}\ ;$$
$$\Delta p = B[\Delta\sigma_3 + A(\Delta\sigma_1 - \Delta\sigma_3)]\ ; \qquad B = \frac{1}{1+n\beta K}\ ; \qquad A = \frac{1}{3} - \frac{1}{2}\frac{K}{M}\ ;$$

Boussinesq:
$$\text{Point load:/Puntlast: } r = 0: \quad \sigma_{zz} = \frac{3P}{2\pi z^2}\ ; \qquad \text{Rigid plate:/Starre plaat: } z = 0: \quad \sigma_{zz} = \frac{(P/(\pi a^2))}{2\sqrt{1 - r^2/a^2}}\ ; \qquad u_z = \frac{\pi}{2}(1-\nu^2)\frac{\overline{p}a}{E}\ ;$$
$$\text{Flexible plate:/Flexibele plaat: } r = 0: \quad \frac{\sigma_{zz}}{p} = 1 - \frac{z^3}{b^3}\ ; \qquad b = \sqrt{z^2 + a^2}\ ; \qquad z = 0: \quad u_z = 2(1-\nu^2)\frac{pa}{E}\ ;$$

Flamant:
$$\text{Line load:/Lijnlast:} \quad \sigma_{zz} = \frac{2F}{\pi}\frac{z^3}{r^4}\ ; \qquad \sigma_{xx} = \frac{2F}{\pi}\frac{x^2 z}{r^4}\ ; \qquad \sigma_{zx} = \frac{2F}{\pi}\frac{xz^2}{r^4}\ ; \qquad r = \sqrt{x^2 + z^2}\ ; \qquad \text{Smooth wall:/Gladde wand: } Q = \frac{2}{\pi}\frac{F}{1 + a^2/h^2}\ ;$$
$$\text{Strip: } x = 0: \quad \sigma_{zz} = \frac{2p}{\pi}[\arctan(\frac{a}{z}) + \frac{az}{a^2 + z^2}]\ ; \qquad \sigma_{xx} = \frac{2p}{\pi}[\arctan(\frac{a}{z}) - \frac{az}{a^2 + z^2}]\ ; \qquad \text{Smooth wall:/Gladde wand:} \quad Q = \frac{2}{\pi}ph\arctan\frac{a}{h}\ ;$$

Lateral stress:/
Horizontale druk:
$$K = \frac{\nu}{1-\nu}\ ; \qquad K_0 \approx 1 - \sin\phi'\ ; \qquad K_a = \frac{1-\sin\phi'}{1+\sin\phi'}\ ; \qquad K_p = \frac{1+\sin\phi'}{1-\sin\phi'}\ ; \qquad \sigma'_{xx} = K_a\gamma' z - 2c'\sqrt{K_a}\ ; \qquad \sigma'_{xx} = K_p\gamma' z + 2c'\sqrt{K_p}\ ;$$
$$Q = \frac{1}{2}K\gamma h^2\ ; \qquad Q_h = Q\sin(\alpha - \delta)\ ; \qquad \text{Rankine/Coulomb} \quad \text{Active:/Actief:} \quad \theta = \frac{\pi}{4} - \frac{\phi}{2}\ ; \qquad \text{Passive:/Passief:} \quad \theta = \frac{\pi}{4} + \frac{\phi}{2}\ ;$$
$$K_a = \frac{\sin^2(\alpha+\phi)}{\sin^2\alpha\sin(\alpha-\delta)\left[1 + \sqrt{\{\sin(\phi+\delta)\sin(\phi-\beta)\}/\{\sin(\alpha-\delta)\sin(\alpha+\beta)\}}\right]^2}\ ; \qquad K_p = \frac{\sin^2(\alpha-\phi)}{\sin^2\alpha\sin(\alpha-\delta)\left[1 - \sqrt{\{\sin(\phi-\delta)\sin(\phi+\beta)\}/\{\sin(\alpha-\delta)\sin(\alpha+\beta)\}}\right]^2}\ ;$$

Prandtl:
$$\phi = 0: \quad p_c = (\pi + 2)c\ ;$$

Brinch Hansen:
$$p_c = cN_c i_c s_c + qN_q i_q s_q + \frac{1}{2}\gamma' BN_\gamma i_\gamma s_\gamma\ ; \qquad N_q = \frac{1+\sin\phi}{1-\sin\phi}\exp(\pi\tan\phi)\ ; \qquad N_c = (N_q - 1)\cot\phi\ ; \qquad N_\gamma = 2(N_q - 1)\tan\phi\ ;$$
$$i_c = 1 - \frac{t}{c + p\tan\phi}\ ; \qquad i_q = i_c^2\ ; \qquad i_\gamma = i_c^3\ ; \qquad s_c = 1 + 0.2\frac{B}{L}\ ; \qquad s_q = 1 + \frac{B}{L}\sin\phi\ ; \qquad s_\gamma = 1 - 0.3\frac{B}{L}\ ; \qquad (L \geq B)\ ;$$

Infinite slope:/
Oneindig talud:
$$c = 0: \quad F = \frac{\tan\phi}{\tan\alpha}\ ; \qquad \text{Flow parallel to surface:/Stroming evenwijdig oppervlak:} \quad F = \frac{\gamma - \gamma_w}{\gamma}\frac{\tan\phi}{\tan\alpha}\ ; \qquad \text{Horizontal flow:/Horizontale stroming:} \quad F = \frac{\gamma - \gamma_w/\cos^2\alpha}{\gamma}\frac{\tan\phi}{\tan\alpha}\ ;$$

Slope stability:/
Glijvlak:
$$\text{Fellenius:} \quad F = \frac{\sum\{[c + (\gamma h\cos^2\alpha - p)\tan\phi]/\cos\alpha\}}{\sum\gamma h\sin\alpha}\ ; \qquad \text{Bishop:} \quad F = \frac{\sum\frac{c + (\gamma h - p)\tan\phi}{\cos\alpha(1 + \tan\alpha\,\tan\phi/F)}}{\sum\gamma h\sin\alpha}\ ;$$

Coefficient of active earth pressure/Coëfficiënt van actieve gronddruk, K_a.

$\alpha = 90°,\ \beta = 0°$:

$\delta \setminus \phi$	10°	15°	20°	25°	30°	35°	40°	45°
0°	0.704	0.589	0.490	0.406	0.333	0.271	0.217	0.172
5°	0.662	0.556	0.465	0.387	0.319	0.260	0.210	0.166
10°	0.635	0.533	0.447	0.373	0.308	0.253	0.204	0.163
15°	0.617	0.518	0.434	0.363	0.301	0.248	0.201	0.160
20°	0.607	0.508	0.427	0.357	0.297	0.245	0.199	0.160
25°	0.604	0.505	0.424	0.355	0.296	0.244	0.199	0.160
30°	0.606	0.506	0.424	0.356	0.297	0.246	0.201	0.162

$\alpha = 90°,\ \beta = 10°$:

$\delta \setminus \phi$	10°	15°	20°	25°	30°	35°	40°	45°
0°	0.970	0.704	0.569	0.462	0.374	0.300	0.238	0.186
5°	0.974	0.679	0.547	0.444	0.359	0.289	0.230	0.180
10°	0.985	0.664	0.531	0.431	0.350	0.282	0.225	0.177
15°	1.004	0.655	0.522	0.423	0.343	0.277	0.221	0.174
20°	1.032	0.654	0.518	0.419	0.340	0.275	0.220	0.174
25°	1.070	0.658	0.518	0.419	0.340	0.275	0.221	0.175
30°	1.120	0.669	0.524	0.422	0.343	0.278	0.223	0.177

$\alpha = 90°,\ \beta = 20°$:

$\delta \setminus \phi$	10°	15°	20°	25°	30°	35°	40°	45°
0°			0.883	0.572	0.441	0.344	0.267	0.204
5°			0.886	0.558	0.428	0.333	0.259	0.199
10°			0.897	0.549	0.420	0.326	0.254	0.195
15°			0.914	0.546	0.415	0.323	0.251	0.194
20°			0.940	0.547	0.414	0.322	0.250	0.193
25°			0.974	0.553	0.417	0.323	0.252	0.195
30°			1.020	0.565	0.424	0.328	0.256	0.198

$\alpha = 90°,\ \beta = 30°$:

$\delta \setminus \phi$	10°	15°	20°	25°	30°	35°	40°	45°
0°					0.750	0.436	0.318	0.235
5°					0.753	0.428	0.311	0.229
10°					0.762	0.423	0.306	0.226
15°					0.776	0.422	0.305	0.225
20°					0.798	0.425	0.305	0.225
25°					0.828	0.431	0.309	0.228
30°					0.866	0.442	0.315	0.232

$\alpha = 80°,\ \beta = 0°$:

$\delta \setminus \phi$	10°	15°	20°	25°	30°	35°	40°	45°
0°	0.757	0.652	0.559	0.478	0.407	0.343	0.287	0.238
5°	0.720	0.622	0.536	0.460	0.393	0.333	0.280	0.233
10°	0.699	0.603	0.520	0.448	0.384	0.326	0.275	0.229
15°	0.687	0.592	0.511	0.441	0.378	0.323	0.273	0.228
20°	0.684	0.588	0.508	0.438	0.377	0.322	0.273	0.229
25°	0.689	0.591	0.510	0.440	0.379	0.325	0.276	0.232
30°	0.702	0.600	0.517	0.446	0.385	0.330	0.281	0.237

$\alpha = 80°,\ \beta = 10°$:

$\delta \setminus \phi$	10°	15°	20°	25°	30°	35°	40°	45°
0°	1.047	0.784	0.654	0.550	0.461	0.384	0.318	0.261
5°	1.067	0.766	0.636	0.534	0.448	0.374	0.311	0.255
10°	1.097	0.759	0.626	0.524	0.440	0.368	0.307	0.253
15°	1.138	0.759	0.622	0.520	0.437	0.366	0.305	0.252
20°	1.191	0.768	0.625	0.521	0.438	0.367	0.306	0.254
25°	1.259	0.785	0.634	0.528	0.443	0.371	0.310	0.257
30°	1.346	0.811	0.650	0.539	0.452	0.379	0.317	0.264

$\alpha = 80°,\ \beta = 20°$:

$\delta \setminus \phi$	10°	15°	20°	25°	30°	35°	40°	45°
0°			1.015	0.684	0.548	0.444	0.360	0.291
5°			1.035	0.676	0.538	0.436	0.354	0.286
10°			1.064	0.674	0.534	0.432	0.351	0.283
15°			1.103	0.679	0.535	0.432	0.350	0.284
20°			1.155	0.690	0.540	0.435	0.354	0.286
25°			1.221	0.708	0.551	0.443	0.360	0.292
30°			1.305	0.734	0.568	0.456	0.370	0.300

$\alpha = 80°,\ \beta = 30°$:

$\delta \setminus \phi$	10°	15°	20°	25°	30°	35°	40°	45°
0°					0.925	0.566	0.433	0.337
5°					0.943	0.563	0.428	0.333
10°					0.969	0.564	0.427	0.332
15°					1.005	0.570	0.430	0.333
20°					1.051	0.582	0.437	0.338
25°					1.111	0.600	0.448	0.346
30°					1.189	0.624	0.463	0.358

Coefficient of passive earth pressure/Coëfficiënt van passieve gronddruk, K_p.

$\alpha = 90°,\ \beta = 0°$:

$\delta \setminus \phi$	10°	15°	20°	25°	30°	35°	40°	45°
0°	1.420	1.698	2.040	2.464	3.000	3.690	4.599	5.828
−5°	1.569	1.901	2.313	2.833	3.505	4.391	5.593	7.278
−10°	1.730	2.131	2.635	3.285	4.143	5.309	6.946	9.345
−15°	1.914	2.403	3.029	3.855	4.976	6.555	8.872	12.466
−20°	2.130	2.735	3.525	4.597	6.105	8.324	11.771	17.539
−25°	2.395	3.151	4.169	5.599	7.704	10.980	16.473	26.696
−30°	2.726	3.691	5.036	7.013	10.095	15.273	24.933	46.087

$\alpha = 90°,\ \beta = 10°$:

$\delta \setminus \phi$	10°	15°	20°	25°	30°	35°	40°	45°
0°		2.099	2.595	3.235	4.080	5.228	6.841	9.204
−5°		2.467	3.086	3.908	5.028	6.605	8.923	12.518
−10°		2.907	3.700	4.783	6.314	8.569	12.076	17.944
−15°		3.456	4.496	5.969	8.145	11.536	17.225	27.812
−20°		4.166	5.572	7.652	10.903	16.370	26.569	48.891
−25°		5.122	7.093	10.181	15.384	25.117	46.474	108.431
−30°		6.470	9.371	14.274	23.468	43.697	102.545	426.159

$\alpha = 80°,\ \beta = 0°$:

$\delta \setminus \phi$	10°	15°	20°	25°	30°	35°	40°	45°
0°	1.363	1.582	1.843	2.156	2.535	3.002	3.587	4.332
−5°	1.480	1.737	2.045	2.418	2.879	3.456	4.193	5.158
−10°	1.600	1.905	2.273	2.725	3.292	4.017	4.966	6.244
−15°	1.732	2.096	2.540	3.094	3.802	4.730	5.981	7.726
−20°	1.883	2.321	2.861	3.549	4.450	5.666	7.363	9.838
−25°	2.060	2.590	3.257	4.127	5.299	6.937	9.329	13.021
−30°	2.274	2.923	3.759	4.881	6.450	8.742	12.286	18.184

$\alpha = 80°,\ \beta = 10°$:

$\delta \setminus \phi$	10°	15°	20°	25°	30°	35°	40°	45°
0°		1.935	2.308	2.767	3.343	4.079	5.043	6.340
−5°		2.218	2.668	3.233	3.960	4.914	6.201	7.998
−10°		2.541	3.093	3.805	4.742	6.010	7.783	10.372
−15°		2.922	3.614	4.528	5.767	7.504	10.045	13.969
−20°		3.387	4.272	5.474	7.162	9.636	13.465	19.844
−25°		3.975	5.131	6.759	9.148	12.854	19.039	30.500
−30°		4.740	6.295	8.583	12.137	18.084	29.127	53.188